

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 October 2004 (21.10.2004)

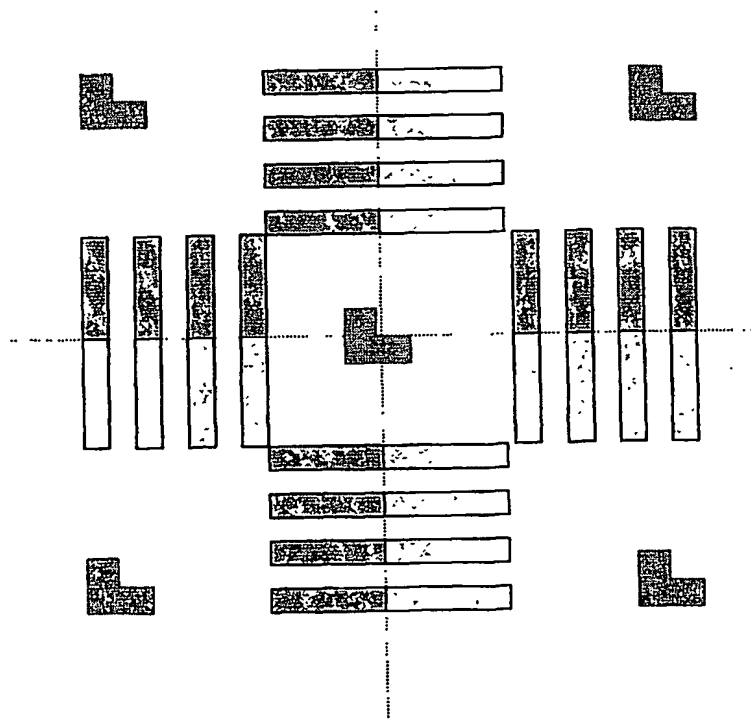
PCT

(10) International Publication Number
WO 2004/090979 A3

- (51) International Patent Classification⁷: **H01L 23/544** (74) Agent: NOVAGRAAF PATENTS LIMITED; The Crescent, 54 Blossom Street, York YO24 1AP (GB).
- (21) International Application Number: PCT/GB2004/001536 (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 8 April 2004 (08.04.2004) (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0308086.8 8 April 2003 (08.04.2003) GB
0308180.9 9 April 2003 (09.04.2003) GB
- (71) Applicant (for all designated States except US): AOTI OPERATING COMPANY, INC [US/US]; 131 NW Hawthorne Avenue, Suite 207, Bend, OR 97701 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): SMITH, Nigel, Peter [GB/—]; Accent Optical Technologies, Haxby Road, York YO31 8SD (GB). HAMMOND, Michael, John [GB/GB]; Accent Optical Technologies, Haxby Road, York YO31 8SD (GB).
- Published:
— with international search report

[Continued on next page]

(54) Title: OVERLAY METROLOGY MARK



(57) Abstract: An overlay metrology mark for determining the relative position between two or more layers of an integrated circuit structure comprising a first mark portion associated with and in particular developed on a first layer and a second mark portion associated with and in particular developed on a second layer, wherein the first and second mark portions together constitute, when the mark is properly aligned, at least one pair of test zones, each test zone comprising a first mark section formed as part of the first mark portion and a second mark section formed as part of the second mark portion each comprising a plurality of elongate rectangular mark structures in parallel array adjacently disposed to form the said test zone such that the mark structures in each test zone are in alignment in a first direction within the test zone but are substantially at 90° with respect to the mark structures of at least one other test zone in alignment in a second direction, and wherein the test zones making up the or each pair are laterally displaced relative to each other along one of the said directions. A method of marking and a method of determining overlay error are also described.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(88) Date of publication of the international search report:
2 December 2004

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/001536

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L23/544

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L G03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

27 September 2004

Date of mailing of the international search report

08/10/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3018

Authorized officer

Corchia, A

INTERNATIONAL SEARCH REPORT

 Int. Application No
 PCT/GB2004/001536

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/19415 A (KLA TENCOR CORP) 7 March 2002 (2002-03-07) page 1, lines 9-23	1-26
X	page 11, lines 12-30	12-15
X	page 11, lines 32,33	4
X	page 14, line 18 - page 15, line 19	7
X	page 16, lines 5-11	5,6
X	page 16, line 14 - page 17, line 6	14
X	page 18, lines 1-26	
X	page 19, line 23 - page 20, line 5	
X	page 20, lines 25-32	
X	page 22, lines 14-21	
X	page 23, line 4 - page 24, line 16	12-14,19
X	page 25, lines 24-26	15
	page 28, lines 22-32	
	page 30, line 32 - page 31, line 5; figure 8	
	page 32, line 10 - page 35, line 27; figure 9	
X	page 36, line 18 - page 39, line 17; figure 12	1-3, 8-14, 16-18,20
	page 43, line 13 - page 45, line 3; figure 17	
X	page 46, line 16 - page 47, line 11; figures 19-22	21-26
X	page 50, lines 7-20	23
X	page 55, line 31 - page 56, line 8	14
X	WO 02/18871 A (KLA TENCOR CORP) 7 March 2002 (2002-03-07) page 1, line 15 - page 2, line 33 page 4, lines 13-33 page 5, line 3 - page 6, line 14; figure 1 page 7, line 26 - page 8, line 26 page 9, lines 19-22 page 10, line 31 - page 11, line 13; figure 2 page 12, line 25 - page 15, line 20; figure 4	1-7, 11-26
X	EP 0 818 814 A (KLA INSTR CORP) 14 January 1998 (1998-01-14) column 1, lines 1-35 column 2, lines 5-9 column 3, lines 42-58 column 4, line 11 - column 5, line 32; figure 1b column 8, line 7 - column 10, line 19; figure 4 column 11, lines 21-25	1-7, 11-26

-/--

INTERNATIONAL SEARCH REPORT

In tional Application No
PCT/GB2004/001536

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 4 343 878 A (CHIANG PING-WANG) 10 August 1982 (1982-08-10) column 1, lines 12-36,47-55 column 1, line 65 - column 2, line 17 column 2, line 53 - column 3, line 34 column 13, line 38 - column 16, line 16; figures 11-20 column 16, line 46 - column 17, line 62; figure 29</p>	1-26
A	<p>US 2001/019401 A1 (ISHIMARU KATSUAKI ET AL) 6 September 2001 (2001-09-06) paragraphs '0001!, '0002!, '0015! paragraphs '0083! - '0087!; figures 4,9</p>	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB2004/001536

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0219415	A	07-03-2002	EP 1314198 A1 JP 2004508711 T WO 0219415 A1 US 2003021465 A1 US 2003021466 A1 US 2003026471 A1 US 2003021467 A1	28-05-2003 18-03-2004 07-03-2002 30-01-2003 30-01-2003 06-02-2003 30-01-2003
WO 0218871	A	07-03-2002	US 6486954 B1 EP 1328774 A1 JP 2004507901 T WO 0218871 A1	26-11-2002 23-07-2003 11-03-2004 07-03-2002
EP 0818814	A	14-01-1998	US 6023338 A EP 0818814 A2 US 6079256 A	08-02-2000 14-01-1998 27-06-2000
US 4343878	A	10-08-1982	NONE	
US 2001019401	A1	06-09-2001	JP 2001318470 A TW 529078 B	16-11-2001 21-04-2003